

II.20 Alaska's Cooperative Bait Program

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Situation

Recent agricultural land development in Delta Junction, AK, has created conditions favorable for epidemic outbreaks of grasshoppers where there were few outbreaks before. Cooperative Federal grasshopper control programs in these agricultural areas have not been possible because of a 10-mile no-spray buffer zone around peregrine falcon habitat. In addition, the lack of Environmental Protection Agency (EPA) registration for use of carbaryl on barley, a major cereal crop in the area, hampered individual control efforts.

With the help of the University of Alaska Cooperative Extension Service, agricultural producers in the Delta Junction area turned to integrated pest management (IPM) techniques to control grasshopper outbreaks. Using readily available materials, small-batch mixing equipment, and spreading equipment, farmer cooperatives demonstrated the success of a local IPM philosophy.

Baiting hatching beds with carbaryl-treated wheat bran has been an effective means of controlling grasshopper populations in other States. Wheat is not a common crop grown in Alaska other than for personal use, so wheat bran is not readily available for use in baits. The farmers' cooperative successfully demonstrated that locally grown barley could successfully be substituted for wheat bran as a bait. The owner of the Sevin® registration label, Rhone-Poulenc, has stated (personal communication) that coarse barley millings can be substituted for wheat bran in formulating the carbaryl bait. Thus, the use of locally grown barley allows Alaskan farmers to formulate an effective carbaryl bait economically.

Alaska conducted a cooperatively developed grasshopper baiting trial with the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) and USDA's Agricultural Research Service (ARS), Rhone-Poulenc (carbaryl manufacturer), and the University of Alaska-Fairbanks Cooperative Extension Service. The trial used locally grown cereal grains (dry rolled barley and oats) as bait substrates. USDA/ARS laboratory bait-acceptance trials indicated that Alaskan grasshopper species would eat the barley bait.

A producer cooperative can be especially important in areas of widespread grasshopper infestation where the demand for bait application may exceed capabilities for bait formulation, distribution, and application. The cooperative can play an important role in:

- obtaining carbaryl insecticides and bait substrate material;
- providing equipment for formulating, transporting and applying bait;
- deciding on areas to which the bait is applied; and
- maintaining communication among users, the public, and regulatory agencies.

Producer cooperatives already exist in many rural communities. A board of directors elected from the producer membership governs these coops. The Alaska Farmers Cooperative of Delta Junction is such an organization and served as the bait cooperative in this trial program.

Bait Production

ARS' Rangeland Insects Lab in Bozeman, MT, tested local Alaskan barley and also oat products and found them suitable as a bait substrate. Rhone-Poulenc granted temporary permission to use Alaskan-grown barley as a bait substrate for the trial.

The cooperative obtained a 1/4-yd³ cement mixer to mix and formulate the bait. Bait batch ingredients included 100 lb of dry rolled barley, mixed with 2 qt each of carbaryl (Sevin 4-Oil®) and diesel oil. This combination produced a 2 percent carbaryl bait formulation. While the cement mixer rotated at approximately 50 revolutions per minute, a 50:50 mix of carbaryl and diesel oil was sprayed into the mixer with a portable sprayer. Using an 80-degree flat fan nozzle operated at approximately 30 lb/in², spray operators adjusted the sprayer pressure as high as possible with minimal overspray and misting. A cardboard cover installed over the cement mixer opening reduced spray drift.

A preliminary trial using rolled barley and water colored with red food dye determined mixing time requirements. It took nearly 30 seconds to add the liquid. Three minutes of agitation thoroughly mixed the bait and carbaryl material.

The cooperative mixed bait on an as-needed basis, with surplus bait stored in a cool, dry, signed, and locked storage facility. No bait was stored longer than 48 hours before application. The cooperative rebagged formulated bait in plastic woven sacks, each containing approximately 50 lb. All bags were sewn shut and labeled as “CARBARYL BAIT—CAUTION” with copies of the carbaryl label attached.

The cooperative used Wilmar 500 fertilizer spin-spreaders calibrated with water-treated rolled barley, to decide application rates. A bait application rate of 36 lb/acre, or 0.7 lb/acre of carbaryl, achieved a distribution density of 40 particles/ft² of soil surface area. This rate is within the limits specified on the carbaryl label.

Barley particle size and density are variable depending on the adjustment of the roller mill, which processes the bait substrate. Procedures for calibrating spreaders are available at Alaska’s Cooperative Extension Service offices and through the State at State Office Fairbanks, Cooperative Extension Service, University of Alaska Fairbanks, Fairbanks, AK 99775-5200, (907) 474-6357.

Training and Certification Program

The Cooperative Extension Service developed a training course for carbaryl bait applicators somewhat similar to the pesticide certification training administered by the APHIS Plant Protection and Quarantine unit. The 3-hour course addressed the topics of grasshopper life cycles; preferred food and egg-laying site conditions; scouting techniques; deciding economic thresholds; alternative controls; understanding the carbaryl label; personal and environmental safety; formulating, mixing, calibrating, and applying baits; timing and biological conditions affecting the success of baits; and evaluating the effectiveness of the bait.

An exam followed the course. Only those who successfully passed the exam could participate in the baiting program. Agricultural producers and interested participants from the public could take the course.

Evaluation and Results

All persons applying baits submitted information for recordkeeping. A survey questioned bait users about their opinions on weather conditions when the bait was used, length of time the bait remained available and effective, growth stage of treated grasshoppers, effects on nontarget species (other insects and birds), any personal health effects, and if they would use bait again.

According to survey responses, the bait was effective. Grasshoppers readily ate the bait, and the larger bait particles remained effective even after a rainfall. Only one applicator mentioned effects on nontarget species (a decline in ground beetles following bait application). Another reported the successful raising of three robin clutches that fed on treated grasshoppers. There were no reports or observations of adverse effects on human health.

Conclusion and Discussion

The results of this grasshopper control project show that early and effective reductions in grasshopper populations are possible using a formulated carbaryl–barley bait. The reduction or elimination of pesticide spray drift, the selectivity toward pest species, and the relative safety to human and environmental health all support the approval and recommendation of this bait as an effective IPM tool.

Crop damage from grasshoppers is expected in the Delta agricultural area in the future. Federal and State agencies should authorize and encourage further development of bait-application programs. An acceptable plan must be in place well before potential outbreak periods. If not in place, the long delay in organizing the program could result in the return to more conventional pesticide controls, such as aerial spray operations over large tracts of land.

The experience gained through this trial project and input from participants shows that there are certain conditions and/or alternatives for continued use and future success:

- Barley should be included as an approved bait substrate on the label for carbaryl. This substrate is effective and does not incorporate any significant changes when compared to wheat. Local availability and cost are positive factors toward adoption by farmer–applicators in Alaska.

- The manufacturer(s) of carbaryl could request a waiver or deletion of the label requirement for direct supervision by a government official. A category-specific training and certification program approved by EPA and the State regulatory agency, such as Alaska’s Department of Environmental Conservation (DEC), could substitute for direct supervision. This training program would ensure that all applicators would become knowledgeable in bait formulation, calibration, and application procedures, and all health and safety issues.

- Another alternative to the direct supervision requirement would be to have the Alaska DEC or other State regulatory agency assume this role through the State-approved certification program. The built-in safety and reduced risk of this baiting program compared to other pesticide spray procedures calls for this procedural change.

- A primary component of all future activities is education. The pesticide applicator training and certification program developed and maintained by the Alaska DEC and the Cooperative Extension Service has proven to be effective in developing applicator competence and reducing or preventing pesticide incidents. The successful start of such a certification and training component in this project would be reviewed and improved to meet all education and regulatory objectives.

Public awareness of pesticide use and misuse in the environment continues to grow. This awareness has resulted in the adoption and use of IPM philosophy and procedures when pest problems arise. The successful development and results of the grasshopper baiting program in the Delta agricultural area have shown that it is possible to develop an effective, low-cost pest management program that reduces health risks to humans and wildlife and is environmentally safe.